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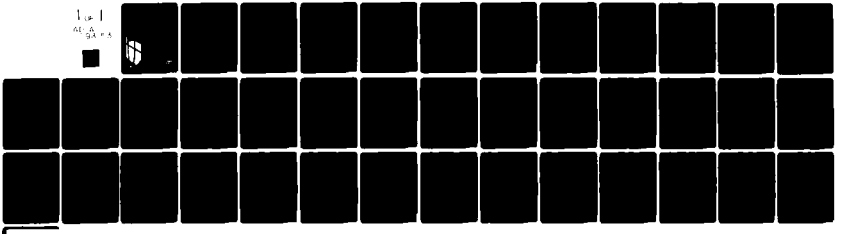

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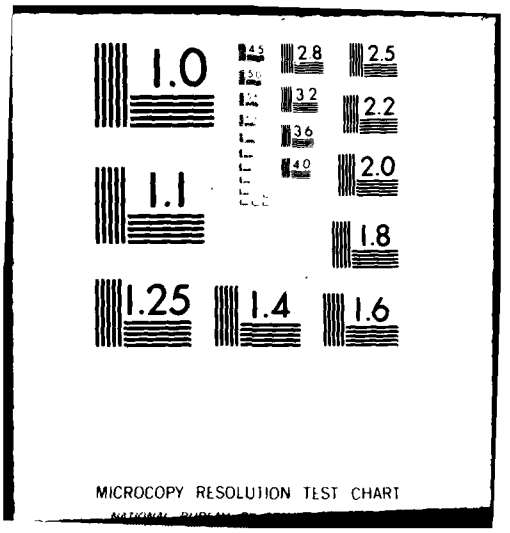
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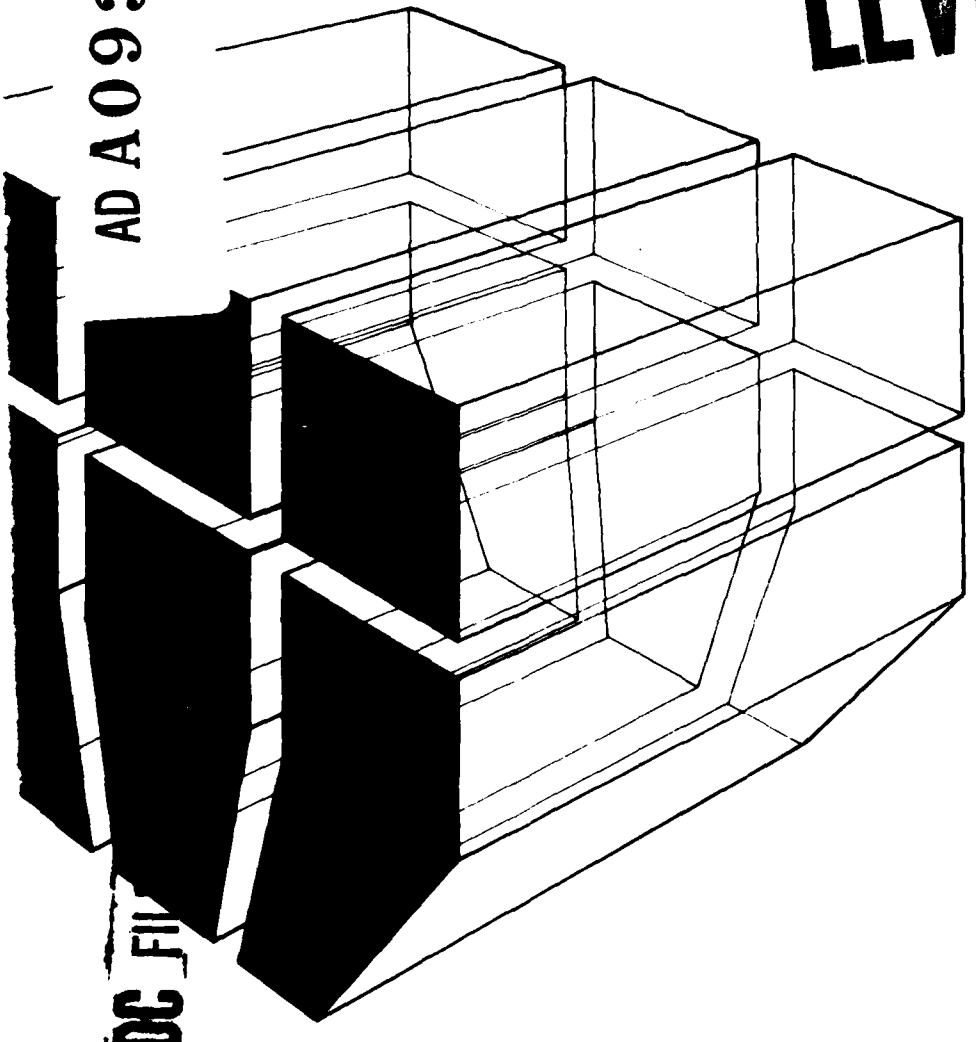
TECHNICAL REPORT E-167
October 1980

AUTOMATED DOCUMENTATION SYSTEM (ADS) STUB GENERATOR: DESCRIPTION AND USER INSTRUCTIONS

(Comprehensive Standard for Software Development)

LEVEL II



by
Linda Lawrie
Jean Baugh

CERL

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This report describes a subsystem of the Automated Documentation System (ADS) called the Stub Generator. The Stub Generator lets software development managers define which ADS documentation sections must be in the final software code. It also lets the manager monitor updated ADS documentation as initial software codes are amended and extended. The programmer is given a convenient way of developing a system in a top-down structural manner through the generation of standard program stubs.

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Block 20 continued.

This report is written for the data processing professional and assumes the reader is familiar with Control Data Corporation (CDC) FORTRAN and UPDATE and the ADS computer system as described in the U.S. Army Construction Engineering Research Laboratory (CERL) Technical Report E-147, *The Automated Documentation System — User Manual* (CERL, February 1979).

FOREWORD

This research was conducted by the Energy Systems Division (ES) of the U.S. Army Construction Engineering Research Laboratory (CERL) for the Engineering and Scientific Division of the Engineering and Data Systems Office, Department of the Army, under RDT&E Program 6.27.25A, "Engineering Software Development", Task 02, "Comprehensive Standard for Software Development." Mr. Gene Manning was the Technical Monitor.

Mr. Douglas C. Hittle was the CERL Principal Investigator. Administrative support was provided by Dr. D. J. Leverenz and Mr. R. G. Donaghy, Chief of CERL-ES.

The ADS Stub Generator program was authored by Ms. J. Baugh and Ms. L. Lawrie. Appreciation is expressed to Ms. M. L. Scala for her help in writing this report.

COL Louis J. Circeo is Commander and Director of CERL, and Dr. L. R. Shaffer is Technical Director.

CONTENTS

AUTOMATED DOCUMENTATION SYSTEM (ADS) STUB GENERATOR: DESCRIPTION AND USER INSTRUCTIONS

1 INTRODUCTION

Background

A useful software tool is the product of a carefully managed and executed software development project.

In 1979, the U.S. Army Construction Engineering Research Laboratory (CERL) introduced a computer system to help guarantee successful management and execution of Army software development. This system, called the Automated Documentation System (ADS), allows internal and external documentation to proceed *simultaneously* with software development.[1]

The ADS Stub Generator is a subsystem of ADS. It lets the software project manager define which ADS documentation sections must be in the final software code. It also lets the manager monitor updated ADS documentation as the initial software code is amended and extended.

This report describes how to use the ADS subsystem Stub Generator. The text is geared to the data processing professional and assumes the reader is familiar with Control Data Corporation (CDC) FORTRAN and UPDATE and the ADS computer system as described in CERL Technical Report (TR) E-147.

Objective

The objective of this study was to develop a method to ensure structured program development and adequate documentation by automatically generating standard program stubs.

Mode of Technology Transfer

The ADS Stub Generator is available from the Boeing Computer Services (BCS) Company under the U.S. Army Corps of Engineers contract for scientific and engineering teleprocessing.

[1]Linda Lawrie, *The Automated Documentation System — User Manual*, Technical Report E-147/ADA067203 (U.S. Army Construction Engineering Research Laboratory, February 1979).

2 OVERVIEW

Stubs are skeletal routines which contain routine headers, preliminary ADS documentation, type statements, common block references, initial debugging output, and RETURN/ END statements. The Stub Generator relieves some of the drudgery of creating these routine stubs by building skeleton FORTRAN modules containing standard UPDATE directives, basic FORTRAN code, and ADS comments from data entered by the user. These skeleton modules are kept in the UPDATE source program library. They can be amended or extended as the system is developed.

First Session

During the first Stub Generator session, the user (usually the software project team leader) sets the desired level of internal program documentation by specifying the required ADS documentation sections (see Appendix A). At this time, the team leader can also set basic "system parameters" for the software being developed; once set, some of these system parameters cannot be changed. For example:

1. The name of the system (in the form of a three-character prefix which is used to generate file names)

2. The password (if any) associated with system files

3. The control character to be used on UPDATE directives.

A complete list of parameters which can and cannot be changed after the first Stub Generator session is in Appendix A, Figure A1. Appendix A also gives a sample of an initial Stub Generator session.

History File

The system history file is maintained by the Stub Generator. It has all the data needed to describe a software system to the Stub Generator (Figure 1). It includes:

1. A list of all options in effect during the last Stub Generator session

2. Data on modules already named or described to the Stub Generator subsystem

3. Data needed to create instructions to update and sort the source program library.

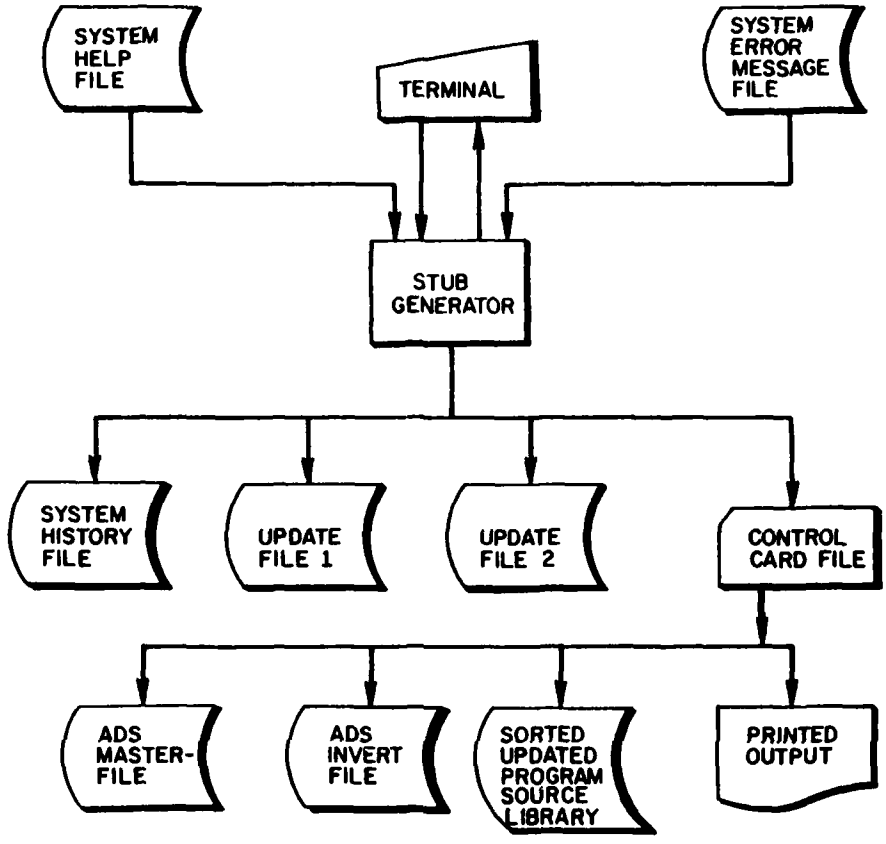


Figure 1. Stub Generator system overview.

Creating Program Modules

During the creation of program modules, the Stub Generator prompts the programmer for information needed to define each program module. The Stub Generator ensures adequate internal program documentation by:

1. Prompting with the ADS section headers in the order specified by the software manager during the first session.

2. Verifying the specified ADS section for the type of module being defined. After the required ADS comments are given to the Stub Generator, the programmer may input additional ADS sections, if desired.

Two UPDATE files can be created during each Stub Generator session. One has preliminary UPDATE directives (such as *ID or *AF) and any modules defined as COMDECKS. The other has UPDATE directives and source code for any modules defined as DECKS.

Both files are kept on disk until a programmer tells the Stub Generator to put them in the source program library. (For more details, see the explanation of the @D command in Chapter 4.)

After the Stub Generator is told to update the source program library, it generates a file of control cards. These cards are used to begin the proper job stream. (This file is sent to the job queue internally. However, the Stub Generator will save this file as

a disk file to be batched by hand, if requested.) Once the job begun by these control cards is complete, any update files will be purged; the newly sorted source program library will be saved and a printed report of the final source library will be output.

If the option to run ADS is in effect when the control card file is created, the control card job will also create and keep two ADS files. It will also produce any ADS reports requested.

A sample programmer session is given in Appendix B. (Actual usage of the Stub Generator will differ from facility to facility. Commands for beginning a session on Boeing Computer Services' (BCS) EKS system are given in Appendix C.)

File List and Function Description

Figure 1 shows the overall file system for the Stub Generator.

The system help file contains the online help messages that are given in response to the @H command (Chapters 4 and 5).

The system error message file contains the online help messages pertaining to error messages issued by the Stub Generator. These messages are given in response to the @M command (see Chapters 4 and 5).

The control card file contains the job stream that is generated and submitted by the Stub Generator. This file may be saved as a permanent disk file. If the user asks the Stub Generator to save the control card file, the permanent file name will be generated by concatenating the user-supplied prefix with CNTL (for three-character prefixes), OCNTL (for two-character prefixes), and LOCNTL (for one-character prefixes). The batch job that is submitted will generate printed output and a sorted UPDATE source program library (OLDPL). The OLDPL contains all of the source code for the software system in a special UPDATE format.

The ADS master and invert files will also be created if the RUN ADS option is in effect. These files contain information about the code in the source program library needed to generate ADS reports.

Options

The Stub Generator optionally inserts initial debugging features when the skeleton modules (Figure 2) are created. These features "trace" program paths and parameter passing.

The initial debugging features are controlled by the logical variables TRACE and PARAMS. These variables (along with the variable DEBUG*) are assumed to be in the standard debug common block of the software system being developed. The TRACE and PARAMS flags can be turned on or off internally during debugging. Besides TRACE, PARAMS, and DEBUG, the Stub Generator assumes that the software system has a routine called TRACER.

Using these variables and the routine TRACER, the Stub Generator automatically creates the code to trace program paths and display passed parameters at routine entries and exits.

Help

Two system message files explain error messages and tell the user what the causes of the error might be. The online help features are invoked by the @H and @M commands. (For details, see Chapters 4 and 5.)

```
      SUBROUTINE SUB1(X,Y)
                                        —generated other statements including
                                        the DEBUG common
      IF (TRACE) CALL TRACER (4HSUB1,1)  —entry trace
      IF (PARAMS) WRITE (DEBUG,*) X,Y    —entry parameters
                                        —other code
      IF (PARAMS) WRITE (DEBUG,*) X,Y    —exit parameters
      IF (TRACE) CALL TRACER (4HSUB1,2)  —exit trace
      RETURN
      END
```

Figure 2. Sample Stub Generator debugging statements.

3 CAPABILITIES AND LIMITATIONS

The Stub Generator automatically generates all the UPDATE directives needed to (1) create a source program library, (2) add new modules, or (3) purge existing modules. As module names are mentioned (either as the module is defined or in a context which identifies the module type), it builds a history of names to warn users of possible conflicts (e.g., using duplicate module names, using the same name in a context that implies different routine types, or creating a subroutine call to a defined subroutine whose argument list has a different number of arguments than the defined subroutine).

For example, if a new module is given the same name as a module already in the system, the Stub Generator will inform the user that the named module exists and ask if he/she wants to purge the existing version. The history may also detect usage conflicts, such as naming a module previously defined as a function in a generated subroutine call, and a few possible error conditions, such as a conflict between the number of formal parameters given in the module definition and the number of parameters given in the argument list of a generated subroutine call to that previously defined module.

Flexible Features

1. The Stub Generator accepts card image input for ADS comments. This lets the user exercise all the formatting capabilities in ADS.

2. Generated subroutine calls and user-defined code (e.g., comments, calculations, and function calls) can be put in any order in the body of the routine. The Stub Generator asks for subroutine calls and other code and requires consecutive negative responses to both requests before completing the module. The Stub Generator will automatically include "RETURN" or "STOP" and "END" statements as needed.

3. The UPDATE source library (OLDPL) is output in a standard order of COMDECKS, main programs, and subroutines and functions. To ask for a nonstandard ordering, the user assigns a level from 1 to 3 to each module when it is defined. The OLDPL will then be created in the order:

   a. COMDECKS

   b. Level 3 routines

   c. Level 2 routines

   d. Level 1 routines.

Each subgroup of either OLDPL ordering is kept in alphabetical order. Module levels are stored in the Stub Generator history file and their order maintained as modules are added or deleted.

4. Permanent files can be accessed under an alternate user number. Thus, the OLDPL and the basic system history file can be generated and maintained under a master account, and be accessed by several different subsidiary accounts.

5. A full update of the ADS master files is always done when an ADS run is requested. This ensures that all possible changes are included. (The Stub Generator creates an ADS batch job to do this; see pp 6, 7.) But if the user is working with a preexisting OLDPL (or if there are a number of completed modules), it may be better to run ADS jobs more tailored to the specific update needs outside of the Stub Generator.

Limitations

1. The Stub Generator has no file editing capabilities other than a very limited line replacement for the job control stream and backspacing one input line. Any big change should be made by a separate UPDATE run or by redefining the defective module.

A module is redefined by entering its name in response to the request for the next routine name and by allowing the STUB Generator to purge the old routine. (Modules cannot be purged or redefined on the first run, since the purge directive is not valid when a new OLDPL is being created.) The Stub Generator does not interactively update the OLDPL; rather, it generates input files of directives and creates a batch job from a user session to accomplish the actual OLDPL modification.

2. Because the Stub Generator is not a FORTRAN compiler, a clean compile is not guaranteed by generating a module. For example, if the software system being developed is to automatically include TRACER calls, the user must define "TRACE" as a logical variable in a standard debug COMDECK which must be included in each of the system's routines. If this is not done, a FORTRAN compile error will occur. To include automatic unformatted parameter writes, "PARAMS" must be defined in the same way

*The output unit for the software system's debugging output.

as TRACE. TRACE, PARAMS, and the standard debug COMDECK refer to the special initial debugging outlined in the overview. The debug COMDECK name is defined during the first Stub Generator session and maintained in the Stub Generator history file (see Chapter 2).

Figure 2 is a sample of the debugging statements created by the Stub Generator.

Output

Batch job output lists (1) all active cards in the OLDPL, (2) any FORTRAN compilation errors, and (3) any ADS reports requested. If an ADS run was not requested, only the OLDPL list will be output. A sample batch job submitted by the Stub Generator is given in Appendix D.

4 COMMAND LANGUAGE AND ONLINE HELP

Nine commands ask for special action from the Stub Generator. The command syntax is a "@" immediately followed by a one-letter command (or the full command word). Table 1 explains each command.

The online help commands (@H and @M) tell the user what type of information the Stub Generator is asking for or what type of errors might account for a particular error message.

The @H command gives clues about the type of information the Stub Generator is currently request-

Table 1
Stub Generator Commands

Abbreviation	Full Command	Explanation
@A	@ABORT	Aborts the Stub Generator program without saving any of the current work files.
@B	@BACKSPACE	Backspaces one record on the last file written. This command must be used carefully. It may not be possible to backspace to the correct place since the Stub Generator maintains several files simultaneously. If a different prompt has intervened since the record to be replaced was displayed, (e.g., I>, M>, I>), the backspace command may not work properly. However, errors can be fixed by doing a standard UPDATE run.
@C	@COMMANDS	Lists the available commands; this list is displayed on the terminal.
@D	@DONE	Begins normal end-of-job processing to generate and submit a batch job to update the OLDPL (and run ADS, if requested).
@E	@ECHO	Toggles echoing of lines input.
@H	@HELP	Asks for online help giving more information on the question currently being asked of the user.
@M	@MESSAGE	Asks for online help giving more information on the last error message given to the user.
@M,####	@MESSAGE,####	Asks for online help for a particular error message identified by a four-digit code (####).
@P	@PRINT	Prints the last line input by the user.
@S	@SAVE	Saves the user's work files and run options without beginning a batch run. The user can then input more definitions later.

ing. It also tells the user what publications to refer to for more detailed explanations or syntactical rules.

The @M command has two forms; both give extended error messages. (Extended error messages give a detailed statement of the error, possible causes, and names of appropriate reference manuals.) Entering "@M" will result in an extended error message for the last displayed error message. Extended error messages may be retrieved by typing "@M,dddd," where "dddd" is the four-digit code preceding the brief message for which the user is requesting additional information

Up to three levels of help may be available for any particular question or error message. A "+" at the end of a help section tells the user that additional help is available.

5 GENERAL HINTS

1. A null line (RETURN) is the same as a negative response for Y/N questions, except during the first run of the Stub Generator, when basic system parameters are defined. During this first run, the default for all parameters is Y.

2. The Stub Generator will output an UPDATE input file for an existing OLDPL when the user exits a session with the @S command. The user should then edit the UPDATE input files to make sure the *AF directives indicate the correct order for the OLDPL. The permanent file names of the update input files are created by concatenating the user-supplied prefix with DTE1 and DTES (for a three-character prefix), PDTE1 and PDTES (for a two-character prefix), or UPDTE1 and UPDTES (for a one-character prefix). For example, if the software prefix is "SAM," the UPDATE input files are SAMDTE1 and SAMDTES. The user can then create a new job stream to begin the UPDATE run.

3. Abbreviations can be used to name both required and optional ADS sections. Valid abbreviations are usually made from the first three characters of the section name (Table 2).

4. When the user ends a list format with a comma, it tells the Stub Generator that the user wants to add more data to the list. For example, if a list of COMDECKS called in a routine is entered as "COM1, COM2, COM3," the Stub Generator will ask the user for another input line. The user then can add more COMDECK names.

5. If the batch job submitted by the Stub Generator fails for any reason, the user should try to resubmit a corrected run before initiating a new Stub Generator session. The exception is when an abort has occurred after an OLDPL manipulation. In this

Table 2
ADS Categories and Valid Abbreviations

ADS Documentation Categories

Category	Abbreviation
Title	TIT
Common block title	COM TIT
Author	AUT
Date Written	DAT
References	REF
Location	LOC
Method	MET
Control cards	CON
Remarks	REM
System	SYS
Flow	FLO
Files	FIL
Algorithm	ALG
System dependencies	SYS DEP
Nonsystem externals	NON SYS EXT
Machine dependencies	MAC DEP
Implementation dependencies	IMP DEP
Variable dictionary	VAR
Revised (date)	REV
Purpose	PUR

case, the user should purge the work files. Any missing output can then be retrieved by beginning the appropriate job *outside* of the Stub Generator. If the output is not retrieved in this way, it will be produced during the next successful Stub Generator run.

6. Three types of prompts are produced by the Stub Generator and give a clue to the type of input expected:

I> This is the standard prompt indicating that a reply to the current question is desired. The type of input desired is generally indicated in the question itself or in the online help (@H).

M> This prompt indicates the Stub Generator is ready to accept multiple input lines. The lines will be accepted as 80-column card image lines. No processing of the line will be done other than to write it to the appropriate file.

CD This prompt indicates the Stub Generator is ready to accept a card image input of an ADS comment. The CD is used as columns 1 and 2 of the line written and need not be repeated by the user.

7. The Stub Generator gives two classes of error messages: warning and error. Warning messages generally tell the user the Stub Generator has detected a special condition and has taken corrective action, is expecting special input (i.e., continuing input following a line ending with a comma), or has detected a condition that may result in an error (i.e., an incorrect number of arguments on a subroutine call to an already defined subroutine). Fatal error messages indicate a severe error that must be corrected and re-input before processing can continue.

6 SUMMARY

The Stub Generator gives the software development manager who relies on ADS a way of standardizing documentation during all phases of project development. By setting specific, unchangeable ADS documentation standards during the first Stub Generator session, the manager guarantees that minimum documentation goals will be met, no matter how often the software is amended or extended. The Stub Generator also lets the manager monitor project progress easily and reliably. The programmer is also given a convenient way of creating program systems in a top-down structural manner through the generation of standard program stubs.

APPENDIX A:
SAMPLE FIRST SESSION

The parameters which define the basic characteristics of the software being developed are set during the first Stub Generator session. This first session is usually done by the software development team leader. The team leader can control the system characteristics and the basic ADS documentation by setting parameters which cannot be changed. In the sample session in this appendix, the system parameter library was saved by using the @S command. The team leader could also choose to define the standard debug common block and the TRACER routine to be used by the system and begin the batch run to create an OLDPL by ending the session with the @D command.

The prompt to the user is "I>". If nothing is shown on that line, the user used only the RETURN key. This key defaults to "YES" or the value indicated in Figure A1.

Parameter	Default	Change† Yes	Change† No	Description
Master Account	None		X	User id under which system parameters were defined and where OLDPL and system library are maintained by system.
System Prefix	None		X	3 user-specified characters that are appended to the front of standard file names to create names uniquely identifying files belonging to a particular system.
Password	Null		X	Password associated with system-maintained permanent files.
Update Control Character	*		X	Character appended to the front of UPDATE directives.
ADS Required Sections	None		X	User-specified list of ADS sections that are to be generated for each module defined. Specified headers will always be generated even if no input is received for that section.
Account Password	Null	X		Password associated with user id under which user is currently running.
List Control	Yes	X		Controls generation of "*IF -DEF, (mod name),1", "C/ LIST,NONE" and "*IF DEF,LISTALL","C/ LIST,ALL", statements to allow control of source listing in compiler output.
Implicit Integer	Yes	X		Controls generation of "IMPLICIT INTEGER (A-Z)" statement.
Standard Debug Deck	Yes	X		User may request the generation of "*CALL" to a user-specified debug comdeck in all DECKS defined.
Debug Deck Name	DEBUGR	X		Name of user-defined debug comdeck to be specified on "*CALL".
Standard OLDPL Order	Yes	X		Standard order = comdecks, main routines, subroutines/functions in alphabetical order within each group. User may request control of ordering of all modules except comdecks.
Nonpropagating Comdecks	Yes	X		Controls generation of "NOPROP" parameter on "*COMDECK" directive.

† Parameters that cannot be changed after the first session are "system parameters." Changeable parameters are "run-time options."

Figure A1. Stub Generator – first session sample.

Parameter	Default	Change † Yes	No	Description
TRACER Calls	Yes	X		Controls generation of calls to a user-defined TRACER routine upon entry and exit to subroutines/functions. Provides a subroutine trace.
Unformatted Parameter Trace	Yes	X		Controls generation of unformatted write statement with I/O list of formal parameters upon entry and exit to subroutines.
Comdeck Define Name	COMM		X	Name to be used in generation of "*IF DEF," directive preceding a block of ADS code in comdecks. Allows suppression of listing of comments.
Routine Define Name	ROUT		X	Name to be used in generation of "*IF DEF," directive preceding a block of ADS code in decks. Allows supression of listing of comments.
ADS Run Initiation	Yes	X		Controls initiation of execution of the ADS program to generate/update master documentation files and/or produce ADS reports. ADS runs will always redocument all modules defined in the old OLDPL. If the generator is being used to generate stubs for an existing system or only reports are desired, it would be more efficient for the user to initiate an ADS run separately.

† Parameters that cannot be changed after the first session are "system parameters." Changeable parameters are "run-time options."

Figure A1. (Cont'd).

```
welcome to the bcs network
your access port is cix 67


select desired service:  eks1

 80/07/09. 07.51.30.
EKS1 760C.N0460.63AA 80/06/29.DS-0   18.55.11. 80/07/08.
[redacted]
TERMINAL      27, TTY
RECOVER/USER ID: jeanb
 *** NEW SCHEDULE FOR NOS 1.4 IMPLEMENTATION.  SEE MSG,NOS ***
C>get,profil/un=cer005
C>call,,jist(master=cer084,sys=sam,pw=test)
 07.55.04. WELCOME TO JEAN'S INTERACTIVE STUBMAKER!
 07.55.04. HANG ON WHILE I CRANK IT UP.

       A D S  S T U B  G E N E R A T O R

 INSTRUCTIONS? (Y/N)
I>y
   THE ADS STUB GENERATOR SYSTEM IS DESIGNED AS AN AID TO A SYSTEMS
DESIGN TEAM IN THE INITIAL STAGES OF DEVELOPING A FORTRAN SYSTEM.
SYSTEM PARAMETERS ARE REQUESTED FROM THE USER TO DETERMINE OPTIONS
DESIRED, AND FOR USE WITH PERMANENT FILE FUNCTIONS. THESE OPTIONS ARE
RETAINED BETWEEN RUNS. SOME OPTIONS MAY BE CHANGED BY THE USER AT THE
BEGINNING OF A RUN.
MOST REQUESTS ARE SELF-EXPLANATORY. IF ADDITIONAL HELP IS REQUIRED,
THE USER MAY REFER TO THE USER'S GUIDE FOR MORE DETAILED INFORMATION,
OR REQUEST ON-LINE HELP FOR THE SPECIFIC QUESTION OR ERROR MESSAGE.
UP TO THREE LEVELS OF ON-LINE HELP ARE AVAILABLE. A "+" FOLLOWING A
SECTION OF TEXT INDICATES MORE HELP FOR THAT ITEM IS AVAILABLE AND
MAY BE RETRIEVED BY REPEATING THE SAME COMMAND (I.E., @H FOR
ADDITIONAL HELP ON THE CURRENT QUESTION, OR @M FOR ADDITIONAL
HELP ON AN ERROR MESSAGE).
AVAILABLE COMMANDS:
@A        @ABORT     ABORT PROCESSING
 @B        @BACK      BACKSPACE ONE RECORD ON LAST FILE WRITTEN
@C        @COMMANDS PRINT LIST OF AVAILABLE COMMANDS
@D        @DONE      NORMAL END OF JOB PROCESSING
@E        @ECHO      TOGGLES ECHOING OF INPUT LINES
@H        @HELP      REQUEST ON-LINE HELP FOR CURRENT QUESTION
@M        @MESSAGE   REQUEST ON-LINE HELP FOR LAST ERROR MESSAGE ISSUED
@M,####   @MESSAGE,####  REQUEST OF ON-LINE HELP FOR SPECIFIED ERROR
                        MESSAGE
@P        @PRINT     PRINT LAST LINE INPUT
@S        @SAVE      SAVE CURRENT FILES AND EXIT PROGRAM

**WARNING: 4700 INVALID TID
```

```
ABORT SESSION? (Y/N)
I>n
  5 UPDATE CONTROL CHAR?
I>
  6 ADS REQ SECTIONS? (NAME1,NAME2,...,NAMEN/NONE)
I>
  7 ACCT PW?
I>
  8 AUTO LIST CONTROL STMT? (Y/N)
I>
  9 AUTO IMPLICIT INTEGER? (Y/N)
I>
 10 AUTO STD DEBUG? (Y/N)
I>
 11 DEBUG DECKNAME?
I>
 12 STD OLDPL ORDER? (Y/N)
I>
 13 AUTO NOPROP COMDECKS? (Y/N)
I>
 14 AUTO TRACER CALLS? (Y/N)
I>
 15 AUTO PARAMETER TRACE? (Y/N)
I>
 16 ADS COMDECK DEF NAME?
I>
 17 ADS ROUTINE DEF NAME?
I>
 18 RUN ADS? (Y/N)
I>
LIST SYSTEM PARAMS? (Y/N)
I>y

SYSTEM PARAMETERS:

  2 MASTER ACCT ID?                : CER084
  3 SYS? (3 CHARS MAX)             : SAM
  4 PW?                            : TEST
  5 UPDATE CONTROL CHAR?           : *
  6 ADS REQ SECTIONS?
 16 ADS COMDECK DEF NAME?          : COMM
 17 ADS ROUTINE DEF NAME?          : ROUT
LIST RUN OPTIONS? (Y/N)
I>y

RUN OPTIONS:

  8 AUTO LIST CONTROL STMT? (Y/N) : Y
  9 AUTO IMPLICIT INTEGER? (Y/N)  : Y
 10 AUTO STD DEBUG? (Y/N)          : Y
 11 DEBUG DECKNAME?                : DEBUGR
```

```
  12 STD OLDPL ORDER? (Y/N)          : Y
  13 AUTO NOPROP COMDECKS? (Y/N)     : Y
  14 AUTO TRACER CALLS? (Y/N)        : Y
  15 AUTO PARAMETER TRACE? (Y/N)     : Y
  18 RUN ADS? (Y/N)                  : Y
ANY CHANGES? (Y/N)
I>y
ENTER ALL, # OR <CR>
I>6
  6 ADS REQ SECTIONS? (NAME1,NAME2,...,NAMEN/NONE)
I>tit,com tit,aut,dat
ENTER ALL, # OR <CR>
I>
LIST SYSTEM PARAMS? (Y/N)
I>y

SYSTEM PARAMETERS:

  2 MASTER ACCT ID?                  : CER084
  3 SYS? (3 CHARS MAX)               : SAM
  4 PW?                              : TEST
  5 UPDATE CONTROL CHAR?             : *
  6 ADS REQ SECTIONS?
        TITLE%=
        COMMON BLOCK TITLE%=
        AUTHOR%=
        DATE WRITTEN%=
 16 ADS COMDECK DEF NAME?            : COMM
 17 ADS ROUTINE DEF NAME?            : ROUT
LIST RUN OPTIONS? (Y/N)
I>n
ANY CHANGES? (Y/N)
I>n
MODULE NAME?
I>@s

 OK. JUST A SECOND. I'M A SLOW WRITER.
 08.00.42. COME AGAIN!
EXIT.
C>
```

APPENDIX B:
SAMPLE RUN

The sample run in this appendix has examples of basic features like help commands and how to input ADS comments. A sample version of a TRACER routine and a debugging common block have been entered in this session and a batch run was begun to create an OLDPL. The job stream generated for the batch job is shown on p 24. This version uses KCL procedures, which restrict the range of valid UPDATE characters that can be used as the UPDATE control character. Only the characters A-Z, 0-9, and * can be passed as parameters to the procedures in the standard profile. The Stub Generator will only generate input files for UPDATE runs using other valid UPDATE control characters if the user creates a new job stream outside the Stub Generator.

Prompts to the user are "I>", "M>", and "CD". If nothing is shown on the prompt line, the user has entered only the RETURN.

```
        A D S   S T U B   G E N E R A T O R

 INSTRUCTIONS? (Y/N)
I>n
  7 ACCT PW?
I>blastu
LIST SYSTEM PARAMS? (Y/N)
I>y

SYSTEM PARAMETERS:

  2 MASTER ACCT ID?                : CER084
  3 SYS? (3 CHARS MAX)             : SAM
  4 PW?                            : TEST
  5 UPDATE CONTROL CHAR?           : *
  6 ADS REQ SECTIONS?
        TITLE%=
        COMMON BLOCK TITLE%=
        AUTHOR%=
        DATE WRITTEN%=
 16 ADS COMDECK DEF NAME?          : COMM
 17 ADS ROUTINE DEF NAME?          : ROUT
LIST RUN OPTIONS? (Y/N)
I>y

RUN OPTIONS:

  8 AUTO LIST CONTROL STMT? (Y/N) : Y
  9 AUTO IMPLICIT INTEGER? (Y/N)  : Y
 10 AUTO STD DEBUG? (Y/N)          : Y
 11 DEBUG DECKNAME?                : DEBUGR
 12 STD OLDPL ORDER? (Y/N)         : Y
 13 AUTO NOPROP COMDECKS? (Y/N)    : Y
 14 AUTO TRACER CALLS? (Y/N)       : Y
 15 AUTO PARAMETER TRACE? (Y/N)    : Y
 18 RUN ADS? (Y/N)                 : Y
ANY CHANGES? (Y/N)
I>y
ENTER ALL, # OR <CR>
I>6

***ERROR: 2200 OUT OF BOUNDS
ENTER ALL, # OR <CR>
I>@M
NUMERIC VALUE OF USER INPUT EXCEEDS MINIMUM OR MAXIMUM
ALLOWABLE VALUE.+
I>@M
EXAMPLE;USER INPUT=9 FOR OLDPL LEVEL, VALID VALUES ARE 1-3.
  OR    USER SPECIFIED A QUERY NUMBER TO CHANGE AN OPTION THAT
        IS EITHER NOT 1-18 OR IS NOT CHANGEABLE ON THIS RUN
        (SYSTEM PARAMETER).
```

```
I>
LIST SYSTEM PARAMS? (Y/N)
I>n
LIST RUN OPTIONS? (Y/N)
I>n
ANY CHANGES? (Y/N)
I>n
MODULE NAME?
I>debugr
MODULE TYPE? (C,P,F,S)
I>@h
C - COMDECK
P - PROGRAM
F - FUNCTION
S - SUBROUTINE
I>c
COMMONS DEFINITION? (Y/N)
I>y
M>      common /debugr/ debug,trace,params
M>
TYPE STATEMENTS? (Y/N)
I>y
M>   integer debug
M>@b
M>      integer debug
M>      logical trace,params
M>c
M>
DIMENSION STATEMENTS? (Y/N)
I>n
ADS - REQUIRED SECTIONS


CD    COMMON BLOCK TITLE%=
CD    debugr - debugging variable common
CD
OPTIONAL SECTIONS? (SEC1,SEC2,...SECN/NONE)
I>var
CD    VARIABLE DICTIONARY%=
CD    debug% debug file name
CDcd    trace% logical variable for routine tracing calls to timer
CD    params% logical variable for parameter tracing
CD
OPTIONAL SECTIONS? (SEC1,SEC2,...SECN/NONE)
I>none
COMDECK CALLS? (NAME1,NAME2,...,NAMEN/NONE)
I>none
OTHER CODE? (Y/N)
I>n
MODULE NAME?
I>tracer
MODULE TYPE? (C,P,F,S)
```

```
I>s
PARAMETER LIST? (P1,P2,...PN/NONE)
I>sname,flag
TYPE STATEMENTS? (Y/N)
I>n
DIMENSION STATEMENTS? (Y/N)
I>n
ADS - REQUIRED SECTIONS


CD    TITLEZ=
CD    tracer - standard subroutine trace routine
CD

CD    AUTHORZ=
CD    your average programmrHer
CD@p
    YOUR AVERAGE PROGRAMMRHER

CD@b
CD    your average programmer
CD

CD    DATE WRITTENZ=
CD    11oct79
CD
OPTIONAL SECTIONS? (SEC1,SEC2,...SECN/NONE)
I>pur,var
CD    PURPOSEZ=
CD    tracer prints out tracing information (at entry and exit to
CD    subroutines) depending on value of flag
CD
CD    VARIABLE DICTIONARYZ=
CD    sname - input parameter (char format), contains the subroutine
CD            name to be traced
CD    flag - indicator to tracer of what action is to be done;
CD$--   1; enter subroutine sname
CD$--   2; exit subroutine sname
CD
OPTIONAL SECTIONS? (SEC1,SEC2,...SECN/NONE)
I>none
COMDECK CALLS? (NAME1,NAME2,...,NAMEN/NONE)
I>none
SUBROUTINE CALLS? (Y/N)
I>n
OTHER CODE? (Y/N)
I>y
M>c     igo is caluclated flag
M>      if(flag .lt. 1.or. falg .gt. 2) goto 999
M>      goto(901,902), flag
```

```
M>  901 continue
M>c     enter subroutine
M>      tsptr = tsptr + 1
M>      write(debug,702) tsptr,7hentered,sname
M>    goto 1000
M>  902 continue
M>c     exit subroutine
M>      if (tsptr .le. 0) tsptr = 1
M>      write(debug,902) tsptr,7hexited,sname
M>  702 format(1h ,=(1h-),a7,1x,a10)
M>      tsptr = tsptr - 1
M> 1000 continue
M>
SUBROUTINE CALLS? (Y/N)
I>n
OTHER CODE? (Y/N)
I>n
MODULE NAME?
I>main
MODULE TYPE? (C,P,F,S)
I>p
FILE DEFINITIONS? (F1,F2,...FN/NONE)
I>input,output,debug=output
TYPE STATEMENTS? (Y/N)
I>n
DIMENSION STATEMENTS? (Y/N)
I>n
ADS - REQUIRED SECTIONS


CD    TITLE%=
CD    main - a sample main program
CD

CD    AUTHOR%=
CD    y.a. programmer
CD

CD    DATE WRITTEN%=
CD    1200 a.d.
CD
OPTIONAL SECTIONS? (SEC1,SEC2,...SECN/NONE)
I>none
CONDECK CALLS? (NAME1,NAME2,...,NAMEN/NONE)
I>filecom
SUBROUTINE CALLS? (Y/N)
I>y
NAME?
I>sub1
PARAMETERS? (P1,P2,...PN/NONE)
I>param1,param2,param3,param4,param5,param6,param7,param8,param9,parma10
SUBROUTINE CALLS? (Y/N)
```

```
I>n
OTHER CODE? (Y/N)
I>y
M>c     comments and other code can be interspersed with generated
M>c    subroutine calls
M>
SUBROUTINE CALLS? (Y/N)
I>y
NAME?
I>sub2
PARAMETERS? (P1,P2,...PN/NONE)
I>none
SUBROUTINE CALLS? (Y/N)
I>n
OTHER CODE? (Y/N)
I>n
MODULE NAME?
I>sub2
MODULE TYPE? (C,P,F,S)
I>s
PARAMETER LIST? (P1,P2,...PN/NONE)
I>none
TYPE STATEMENTS? (Y/N)
I>n
DIMENSION STATEMENTS? (Y/N)
I>n
ADS - REQUIRED SECTIONS


CD    TITLE%=
CD    sub2 - a sample subroutine
CD

CD    AUTHOR%=
CD    y.a.programmer
CD

CD    DATE WRITTEN%=
CD    any date
CD
OPTIONAL SECTIONS? (SEC1,SEC2,...SECN/NONE)
I>none
COMDECK CALLS? (NAME1,NAME2,...,NAMEN/NONE)
I>none
SUBROUTINE CALLS? (Y/N)
I>n
OTHER CODE? (Y/N)
I>n
MODULE NAME?
I>@d
**FILECOM**

THE ABOVE COMDECKS MUST BE DEFINED PRIOR TO INITIATING A RUN.
ENTER @S TO END SESSION AND SAVE FILES, OR CONTINUE DEFINITIONS.
I>filecom
MODULE TYPE? (C,P,F,S)
```

```
I>c
COMMONS DEFINITION? (Y/N)
I>y
M>      common /filecom/ input,output
M>
TYPE STATEMENTS? (Y/N)
I>n
DIMENSION STATEMENTS? (Y/N)
I>n
ADS - REQUIRED SECTIONS


CD    COMMON BLOCK TITLEX=
CD    filecom - file definition common
CD
OPTIONAL SECTIONS? (SEC1,SEC2,...SECN/NONE)
I>none
CONDECK CALLS? (NAME1,NAME2,...,NAMEN/NONE)
I>none
OTHER CODE? (Y/N)
I>n
MODULE NAME?
I>@d

 OK. JUST A SECOND WHILE I GET IT ALL TOGETHER.
ADS COMMANDS? (Y/N)
I>y
M>title a sample ads run generated by the stub generator

**WARNING: 4400 TERMINATING ; SUPPLIED
M>@p
TITLE A SAMPLE ADS RUN GENERATED BY THE STUB GENERATOR

M>print wide dump for all commons;
M>print wide dump for all routines;
M>draw wide tree;
M>end;
M>
 1 /JOB
 2 STUBGEN,T30,CM130000,P02.
 3 USER,CER084,BLASTU.     JEANB.
 4 GET,PROFIL/UN=CER005.
 5 GET,OLDPL=SAMOPL/UN=0,PW=TEST,NA.
 6 CALL,,UPDTE(OPL=SAMOPL,UN=0,PW=TEST,CT=P,UC=*)
 7 CALL,,OSRT(OPL=SAMOPL,UN=0,PW=TEST,CT=P,UC=*)
 8 CALL,,STADS(OPL=SAMOPL,UN=0,PW=TEST,CT=P,UC=*,INVT=SAMINV,MAST=SAMMAS)
 9 PURGE,SAMDTES.
10 PURGE,SAMDTE1.
11 PURGE,SAMSCMD/NA.
12 PURGE,SAMTCMD/NA.
13 EXIT,U.
14 COPYBF,UPLIST,OUTPUT.
15 IF(FILE(ADSOUT,LO))COPYBF,ADSOUT,OUTPUT,3.
16 EXIT.
17 /EOR
```

```
ANY CHANGES? (Y/N)
I>n
DO YOU WISH TO RUN THIS JOB? (Y/N)
I>n
DO YOU WISH TO SAVE THIS DECK? (Y/N)
I>y
 08.31.35. COME AGAIN!
EXIT.
C>get,samcntl
C>list,f=samcntl

/JOB
STUBGEN,T30,CM130000,P02.
USER,CER084,BLASTU.     JEANB.
GET,PROFIL/UN=CER005.
GET,OLDPL=SAMOPL/UN=0,PW=TEST,NA.
CALL,,UPDTE(OPL=SAMOPL,UN=0,PW=TEST,CT=S,UC=*)
CALL,,OSRT(OPL=SAMOPL,UN=0,PW=TEST,CT=S,UC=*)
CALL,,STADS(OPL=SAMOPL,UN=0,PW=TEST,CT=S,UC=*,INVT=SAMINV,MAST=SAMMAS)
PURGE,SAMDTES.
PURGE,SAMDTE1.
PURGE,SAMSCMD/NA.
PURGE,SAMTCMD/NA.
EXIT,U.
COPYBF,UPLIST,OUTPUT.
IF(FILE(ADSOUT,LO))COPYBF,ADSOUT,OUTPUT,3.
EXIT.
/EOR
/PACK
/READ,SAMDTES
/READ,SAMDTE1
/EOR
*ID SORT
/EOR
YANK$$$
/READ,SAMTCMD
/EOR
YANK$$$
/EOF
*ID ADS
*DF COMM
*DF ROUT
*DF MAIN
*DF SUB2
*DF TRACER
/EOR
/READ,SAMSCMD
/EOF
 EOI ENCOUNTERED.
C>submit,samcntl,ei=cer001
 07.36.15. 80/07/14.LCIIBXZ
C>bye
 JOB PROCESSING CCUS   110.781
BYE  80/07/14. 07.36.30.
```

APPENDIX C:
INSTRUCTIONS FOR BEGINNING A STUB GENERATOR SESSION ON BCS

To begin a Stub Generator session on the Cyber 175 at BCS, the user should login and retrieve the procedure file:

GET,PROFIL/UN=CER005

The user then calls the interactive procedure:

CALL,,JIST(MASTER=<master account>,SYS=<system prefix>,
PW=<password>,TID=<RJE user id>)

The parameter list for the call is:

<master account>: The ID under which the first session is/was executed to define the system parameters. Required so that the Stub Generator can access and maintain required permanent files.

<system prefix>: User-defined system identifier (maximum three characters).

<password>: Password to be associated with system-maintained permanent files. Needed to allow the Stub Generator to access and maintain the proper set of system files.

<RJE user id>: User ID to which output from the batch job is to be sent. This does not have to be specified if the user will not be beginning a batch job at the end of the session (@D command) — the resulting warning can be ignored. If the user fails to enter a TID but does wish to begin a run, the job should be aborted when requested and the procedure restarted with the proper parameters. The Stub Generator submits the batch job from the procedure; thus, an incorrect TID cannot be fixed from within the program.

APPENDIX D:
BATCH JOB OUTPUT

This appendix lists output generated by the batch job begun by the Stub Generator session shown in Appendix B. The OLDPL listing shows the contents of the final sorted OLDPL. Immediately after the OLDPL listing is a short list of compile errors. These errors would not be listed if the batch job had not included an ADS run. The ADS output includes an echo of the commands received, a list of requested reports, and the requested tree of the system as it currently exists.

GENERATING UPDATE DIRECTIVES

DIRECTIVES ... OF DECK *MOVE <DECK DATE>,YANK$$$ *
DIRECTIVES ... OF DECK *MOVE <DECK DATE>,YANK$$$ *
DIRECTIVES ... OF DECK *MOVE <DECK DATE>,YANK$$$ *

UNLABELED OLDPL CORRECTION IDENTIFIERS UPDATE 1.3-498. 80/07/14. 07.36.34. PAGE 1

CORRECTION IDENTS ARE LISTED IN CHRONOLOGICAL ORDER OF INSERTION

YANK$$$ DEBUGR FILECOM TRACER MAIN SUB2

DECKS ARE LISTED IN THE ORDER OF THEIR OCCURRENCE ON A NEW PROGRAM LIBRARY IF ONE IS CREATED BY THIS UPDATE

YANK$$$ DEBUGR FILECOM MAIN SUB2 TRACER

COMMON DECKS ENCOUNTERED

DEBUGR FILECOM

DECKS WRITTEN TO COMPILE FILE

MAIN SUB2 TRACER

THIS UPDATE REQUIRED 347008 WORDS OF CORE.

LIST OF CONTROL, ACTIVE, AND/OR INACTIVE CARDS IN DEBUGR

```
DEBUGR  *COMDECK DEBUGR,NOPROP                                          DEBUGR      1    A
DEBUGR        COMMON /DEBUGR/ DEBUG,TRACE,PARAMS                        DEBUGR      2    A
DEBUGR        INTEGER DEBUG                                             DEBUGR      3    A
DEBUGR        LOGICAL TRACE,PARAMS                                      DEBUGR      4    A
DEBUGR  C                                                               DEBUGR      5    A
DEBUGR  *IF DEF,COMM                                                    DEBUGR      6    A
DEBUGR  CD    COMMON BLOCK TITLE:=                                      DEBUGR      7    A
DEBUGR  CD    DEBUGR - DEBUGGING VARIABLE COMMON                        DEBUGR      8    A
DEBUGR  CD    VARIABLE DICTIONARY:=                                     DEBUGR      9    A
DEBUGR  CD    DEBUG: DEBUG FILE NAME                                    DEBUGR     10    A
DEBUGR  CD    TRACE: LOGICAL VARIABLE FOR ROUTINE TRACING CALLS TO TIMER DEBUGR     11    A
DEBUGR  CD    PARAMS: LOGICAL VARIABLE FOR PARAMETER TRACING            DEBUGR     12    A
DEBUGR  *ENDIF                                                          DEBUGR     13    A
```

LIST OF CONTROL, ACTIVE, AND/OR INACTIVE CARDS IN FILECOM

```
FILECOM *COMDECK FILECOM,NOPROP                                         FILECOM     1    A
FILECOM       COMMON /FILECOM/ INPUT,OUTPUT                             FILECOM     2    A
FILECOM *IF DEF,COMM                                                    FILECOM     3    A
FILECOM CD    COMMON BLOCK TITLE:=                                      FILECOM     4    A
FILECOM CD    FILECOM - FILE DEFINITION COMMON                          FILECOM     5    A
FILECOM *ENDIF                                                          FILECOM     6    A
```

LIST OF CONTROL, ACTIVE, AND/OR INACTIVE CARDS IN MAIN

```
MAIN    *DECK MAIN                                                      MAIN        1    A
MAIN    *IF -DEF,MAIN,1                                                 MAIN        2    A
MAIN    C/    LIST,NONE                                                 MAIN        3    A
MAIN    *IF DEF,LISTALL,1                                               MAIN        4    A
MAIN    C/    LIST,ALL                                                  MAIN        5    A
MAIN          PROGRAM MAIN(INPUT,OUTPUT,DEBUG=OUTPUT)                   MAIN        6    A
MAIN          IMPLICIT INTEGER (A-Z)                                    MAIN        7    A
MAIN    *IF DEF,ROUT                                                    MAIN        8    A
MAIN    CD    TITLE:=                                                   MAIN        9    A
MAIN    CD    MAIN - A SAMPLE MAIN PROGRAM                              MAIN       10    A
MAIN    CD    AUTHOR:=                                                  MAIN       11    A
MAIN    CD    Y.A. PROGRAMMER                                           MAIN       12    A
MAIN    CD    DATE WRITTEN:=                                            MAIN       13    A
MAIN    CD    1200 A.D.                                                 MAIN       14    A
MAIN    *ENDIF                                                          MAIN       15    A
MAIN    *CALL DEBUGR                                                    MAIN       16    A
MAIN    *CALL FILECOM                                                   MAIN       17    A
MAIN          CALL SUB1(PARAM1,PARAM2,PARAM3,PARAM4,PARAM5,PARAM6,PARAM7,MAIN       18    A
MAIN         -    PARAM8,PARAM9,PARAM10)                               MAIN       19    A
MAIN    C     COMMENTS AND OTHER CODE CAN BE INTERSPERSED WITH GENERATED MAIN       20    A
MAIN    C     SUBROUTINE CALLS                                          MAIN       21    A
MAIN          CALL SUB2                                                 MAIN       22    A
MAIN          STOP                                                      MAIN       23    A
MAIN          END                                                       MAIN       24    A
```

LIST OF CONTROL, ACTIVE, AND/OR INACTIVE CARDS IN SUB2

```
SUB2    *DECK SUB2                                                      SUB2        1    A
SUB2    *IF -DEF,SUB2,1                                                 SUB2        2    A
```

LIST OF CONTROL, ACTIVE, AND/OR INACTIVE CARDS IN SUB2

```
SUB2      C/    LIST,NONE                                                  SUB2      3     A
SUB2      *IF DEF,LISTALL,1                                                SUB2      4     A
SUB2      C/    LIST,ALL                                                   SUB2      5     A
SUB2            SUBROUTINE SUB2                                          SUB2      6     A
SUB2            IMPLICIT INTEGER (A-Z)                                   SUB2      7     A
SUB2      *IF DEF,ROUT                                                     SUB2      8     A
SUB2      CD    TITLE:=                                                    SUB2      9     A
SUB2      CD    SUB2 A SAMPLE SUBROUTINE                                   SUB2     10     A
SUB2      CD    AUTHOR:=                                                   SUB2     11     A
SUB2      CD    Y.A.PROGRAMMER                                             SUB2     12     A
SUB2      CD    DATE WRITTEN:=                                             SUB2     13     A
SUB2      CD    ANY DATE                                                   SUB2     14     A
SUB2      *ENDIF                                                           SUB2     15     A
SUB2      *CALL DEBUGR                                                     SUB2     16     A
SUB2            IF(TRACE) CALL TRACER(4HSUB2,1)                          SUB2     17     A
SUB2            IF(TRACE) CALL TRACER(4HSUB2,2)                          SUB2     18     A
SUB2            RETURN                                                   SUB2     19     A
SUB2            END                                                      SUB2     20     A
```

LIST OF CONTROL, ACTIVE, AND/OR INACTIVE CARDS IN TRACER

```
TRACER    *DECK TRACER                                                     TRACER    1     A
TRACER    *IF -DEF,TRACER,1                                                TRACER    2     A
TRACER    C/    LIST,NONE                                                  TRACER    3     A
TRACER    *IF DEF,LISTALL,1                                                TRACER    4     A
TRACER    C/    LIST,ALL                                                   TRACER    5     A
TRACER          SUBROUTINE TRACER(SNAME,FLAG)                            TRACER    6     A
TRACER          IMPLICIT INTEGER (A-Z)                                   TRACER    7     A
TRACER    *IF DEF,ROUT                                                     TRACER    8     A
TRACER    CD    TITLE:=                                                    TRACER    9     A
TRACER    CD    TRACER - STANDARD SUBROUTINE TRACE ROUTINE                 TRACER   10     A
TRACER    CD    AUTHOR:=                                                   TRACER   11     A
TRACER    CD    YOUR AVERAGE PROGRAMMER                                    TRACER   12     A
TRACER    CD    DATE WRITTEN:=                                             TRACER   13     A
TRACER    CD    11OCT79                                                    TRACER   14     A
TRACER    CD    PURPOSE:=                                                  TRACER   15     A
TRACER    CD    TRACER PRINTS OUT TRACING INFORMATION (AT ENTRY AND EXIT TO TRACER   16     A
TRACER    CD    SUBROUTINES) DEPENDING ON VALUE OF FLAG                    TRACER   17     A
TRACER    CD    VARIABLE DICTIONARY:=                                      TRACER   18     A
TRACER    CD    SNAME - INPUT PARAMETER (CHAR FORMAT), CONTAINS THE SUBROUTINE TRACER   19     A
TRACER    CD            NAME TO BE TRACED                                  TRACER   20     A
TRACER    CD    FLAG - INDICATOR TO TRACER OF WHAT ACTION IS TO BE DONE:   TRACER   21     A
TRACER    CD$--   1: ENTER SUBROUTINE SNAME                                TRACER   22     A
TRACER    CD$--   2: EXIT SUBROUTINE SNAME                                 TRACER   23     A
TRACER    *ENDIF                                                           TRACER   24     A
TRACER    *CALL DEBUGR                                                     TRACER   25     A
TRACER          IF(PARAMS) WRITE(DEBUG,*)SNAME,FLAG                      TRACER   26     A
TRACER    C     IGO IS CALCULATED FLAG                                     TRACER   27     A
TRACER          IF(FLAG .LT. 1.OR. FALG .GT. 2) GOTO 999                 TRACER   28     A
TRACER          GOTO(901,902), FLAG                                      TRACER   29     A
TRACER      901 CONTINUE                                                 TRACER   30     A
TRACER    C     ENTER SUBROUTINE                                           TRACER   31     A
TRACER          TSPTR = TSPTR + 1                                        TRACER   32     A
TRACER          WRITE(DEBUG,702) TSPTR,THEMTERED,SNAME                   TRACER   33     A
```

LIST OF CONTROL, ACTIVE, AND/OR INACTIVE CARDS IN TRACER

```
TRACER        GOTO 1000                                                    TRACER      34      A
TRACER      902 CONTINUE                                                   TRACER      35      A
TRACER    C     EXIT SUBROUTINE                                            TRACER      36      A
TRACER          IF (ISPTR .LE. 0) ISPTR = 1                                TRACER      37      A
TRACER          WRITE(DEBUG,902) ISPTR,7HEXITED,SNAME                      TRACER      38      A
TRACER      702 FORMAT(1H ,=(1H=),A7,1X,A10)                               TRACER      39      A
TRACER          ISPTR = ISPTR - 1                                          TRACER      40      A
TRACER     1000 CONTINUE                                                   TRACER      41      A
TRACER          IF(PARAMS)WRITE(DEBUG,*)SNAME,FLAG                         TRACER      42      A
TRACER          RETURN                                                     TRACER      43      A
TRACER          END                                                        TRACER      44      A
4 ERRORS IN TRACER
ERRORS IN
 TRACER 29=       GOTO(901,902), FLAG
 TRACER 33=       WRITE(DEBUG,702) ISPTR,7HENTERED,SNAME
 TRACER 38=       WRITE(DEBUG,902) ISPTR,7HEXITED,SNAME
 TRACER 44=       END

I AN IF STATEMENT MAY BE MORE EFFICIENT THAN A 2 OR 3 BRANCH COMPUTED GO TO STATEMENT.
   TRACER 29
FE SNAMETO1 SYMBOLIC NAME HAS TOO MANY CHARACTERS.
   TRACER 33
FE .902 PRESENT USE OF THIS LABEL CONFLICTS WITH PREVIOUS USES.
   TRACER 38
UNDEFINED STATEMENT NUMBERS 999
```


14 JUL 80 07.36.57. CERL - ADS - MESSAGE OUTPUT PAGE 1

```
** WARNING   DUPLICATE WRITE REQUESTED FOR COMMON BLOCK - DEBUGR  - REQUEST IGNORED
    TITLE A SAMPLE ADS RUN GENERATED BY THE STUB GENERATOR;
    PRINT WIDE DUMP FOR ALL COMMONS;
    PRINT WIDE DUMP FOR ALL ROUTINES;
** WARNING   REQUESTED READ OF RECORD (ROUTINE) -- SUB1    , RECORD NOT ON MASTER FILE
    DRAW WIDE TREE;
    END;
```

DUMP

TITLE.
DEBUGR - DEBUGGING VARIABLE COMMON

VARIABLE DICTIONARY FOR COMMON BLOCK DEBUGR .

DEBUG - DEBUG FILE NAME

PARAMS - LOGICAL VARIABLE FOR PARAMETER TRACING

TRACE - LOGICAL VARIABLE FOR ROUTINE TRACING CALLS TO TIMER

THE ROUTINES WHICH CALL DEBUGR ARE --
MAIN SUB2 TRACER

DUMP

TITLE.
FILECOM - FILE DEFINITION COMMON

VARIABLE DICTIONARY FOR COMMON BLOCK FILECOM.

INPUT - ** NONE **

OUTPUT - ** NONE **

THE ROUTINES WHICH CALL FILECOM ARE --
MAIN

```
TITLE.
MAIN - A SAMPLE MAIN PROGRAM

AUTHOR.
Y.A. PROGRAMMER

DATE WRITTEN.
1200 A.D.

     FILES USED IN MAIN    ARE --
DEBUG     INPUT     OUTPUT

VARIABLE DICTIONARY FOR ROUTINE MAIN    .

     PARAM1  - ** NONE **

     PARAM2  - ** NONE **

     PARAM3  - ** NONE **

     PARAM4  - ** NONE **

     PARAM5  - ** NONE **

     PARAM6  - ** NONE **

     PARAM7  - ** NONE **

     PARAM8  - ** NONE **

     PARAM9  - ** NONE **

     PARAM10 - ** NONE **

        THIS A MAIN PROGRAM OF LENGTH ******* WORDS.

     ROUTINES CALLED BY MAIN    ARE --
SUB1      SUB2

     COMMON BLOCKS CALLED BY MAIN    ARE --
DEBUGN    FILECOM

     THE ROUTINES WHICH CALL MAIN    ARE -- ** NONE **
```

DUMP

TITLE.
SUB2 A SAMPLE SUBROUTINE

AUTHOR.
Y.A.PROGRAMMER

DATE WRITTEN.
ANY DATE

VARIABLE DICTIONARY FOR ROUTINE SUB2 -- ** NONE **

THIS SUBROUTINE HAS A LENGTH OF ******* WORDS.

ROUTINES CALLED BY SUB2 ARE --
TRACER

COMMON BLOCKS CALLED BY SUB2 ARE --
DEBUGH

THE ROUTINES WHICH CALL SUB2 ARE --
MAIN

DUMP

TITLE.
TRACER - STANDARD SUBROUTINE TRACE ROUTINE

AUTHOR.
YOUR AVERAGE PROGRAMMER

DATE WRITTEN.
110CT79

PURPOSE.
TRACER PRINTS OUT TRACING INFORMATION (AT ENTRY AND EXIT TO SUBROUTINES) DEPENDING ON VALUE OF FLAG

VARIABLE DICTIONARY FOR ROUTINE TRACER .

FALG - ** NONE **

FLAG - INDICATOR TO TRACER OF WHAT ACTION IS TO BE DONE;
-- 1; ENTER SUBROUTINE SNAME
-- 2; EXIT SUBROUTINE SNAME

SNAME - INPUT PARAMETER (CHAR FORMAT), CONTAINS THE SUBROUTINE NAME TO BE TRACED

ISPTR - ** NONE **

THIS SUBROUTINE HAS A LENGTH OF ******* WORDS.

ROUTINES CALLED BY TRACER ARE -- ** NONE **

COMMON BLOCKS CALLED BY TRACER ARE --
DEBUGH

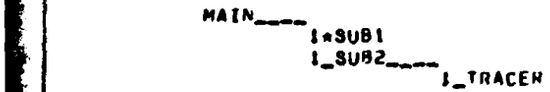
THE ROUTINES WHICH CALL TRACER ARE --
SUB2

CRUSS-REF AS OF 14 JUL 80-NOT FOUND

THE FOLLOWING RECORDS WERE NOT FOUND ON THE MASTER FILE --
SUB1

THE ROUTINES WHICH CALL SUB1 ARE --
MAIN

TREE AS OF 14 JUL 80-MAIN



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